

THURSDAY, JULY 6, 1916.

OCCUPATION AND HEALTH.

Occupations: From the Social, Hygienic, and Medical Points of View. By Sir Thomas Oliver. Pp. x+110. (Cambridge: At the University Press, 1916.) Price 6s. net.

THE subject of this book is the influence of occupation upon health. After a brief historical introduction the author deals with the effect upon health of contamination of the air by smoke and dust, both out of doors and in factories, this discussion being followed by chapters on fatigue, on the hygienic condition of factories, on the relation of occupation to mortality, and on the choice of a career. Finally, an account is given of the harmful effects of certain dusty occupations, of gases, and of electric currents.

The brief space at his disposal and the wide scope of the subject have doubtless made it impossible for the author to give more than the merest outline of the relation of occupation to health. He does not appear, however, to have been altogether happy in his treatment of the question. Although the book contains a mass of interesting information, the reader constantly receives the impression that he is being presented with a succession of disconnected and unrelated statements. No stress has been laid upon fundamental principles, such as that health may be affected either by the nature of the occupation, or by the conditions in which the occupation is carried on. Nor has any attempt been made to distinguish essential from subsidiary factors. The chapter on fatigue, for example, contains scarcely any reference to the means by which industrial fatigue can be recognised or prevented, although recent work has shown both that diminished output is the surest evidence of fatigue, and that the introduction of short rest periods at intervals during the working day lessens the risk of over-fatigue. In view of the extreme importance of the subject, both for employer and employed, a fuller treatment of industrial fatigue would have been advantageous. The book suffers, moreover, from faulty English and from much needless repetition; a paragraph on pp. 55 and 56 is reproduced, for instance, almost word for word on pp. 65 and 66.

The least satisfactory portions of the book are those dealing with the causation of fatigue, and with the action of gases on the body; these are not up to date. In the section on the causation and nature of fatigue the author adopts the obsolete view that toxins formed during muscular exercise are the cause of fatigue; and no reference is made to the modern conception of fatigue, although most, if not all, physiologists now hold that the accumulation of lactic acid in active muscles is an important factor in its production. Again, in the chapter on gases, the author speaks of carbon monoxide toxæmia and apparently regards this gas as directly poisonous; thus the statement is made (p. 89) that

NO. 2436, VOL. 97]

carbon monoxide "may exercise a paralysing influence upon the nerves of the heart, or upon the nerve centres in the medulla oblongata." These statements are erroneous, since Haldane has shown that carbon monoxide is not directly poisonous, and that its harmful effects are due solely to the fact that it displaces oxygen from combination with hæmoglobin; and their inclusion in this book seriously detracts from its scientific value.

In spite of these defects the book contains much that is useful, especially in the chapters on factory hygiene and on dusty occupations, and although it cannot be recommended from a scientific point of view it may prove of value to the general reader. F. A. B.

EXPERIMENTAL SPECTROSCOPY.

Collected Papers on Spectroscopy. By Prof. G. D. Liveing and Sir J. Dewar. Pp. xv+566. (Cambridge: At the University Press, 1915.) Price 30s. net.

THE names of Profs. Liveing and Dewar stand out prominently in the history of modern spectroscopy, and the publication of their collected papers will be cordially welcomed by all who are interested in this rapidly advancing subject. The chief results of their investigations have doubtless already become widely known through references which have appeared in textbooks and in papers by other workers, but to those actually engaged in spectroscopic research it will be a great convenience to have the complete papers in this handy form. Moreover, it will be especially stimulating to students to be able to follow, step by step, the development of the authors' ideas and methods of observation.

The papers have been reprinted from the original sources, with only printers' errors corrected and the addition of a diagram for the sake of greater clearness in the description of an instrument. It may be questioned whether the wisest course has been adopted in the arrangement of the papers, which merely follow each other in the order of dates of publication. There are several instances in which a number of different papers refer to the same subject, and an arrangement in groups would not often have required the dividing up of a paper into sections. Inconvenience arising from the plan adopted, however, is considerably reduced by the addition of a classified index. There is also a useful index of names.

Excluding abstracts of papers which also appear in full, and a few lectures dealing with subjects of the authors' researches, the number of separate papers is about seventy, dating from 1877 to 1904. The first is a brief account of the phosphorescence and flame spectra of calcium fluoride, and it is fortunate that this is the only case in which positions in the spectrum are not expressed on the scale of wave-lengths. It is not possible even to enumerate the subjects of the remaining papers, but it may be mentioned that among the more extensive investigations, each of which occupies several papers, are those on the reversal

of the lines of metallic vapours, the spectra of carbon and its compounds, the ultra-violet spectra of the elements, the emission spectrum of water vapour, the spectrum of magnesium, the absorption spectrum of oxygen, and the spectra of the rare gases. There are also several papers referring to new forms of spectroscopes or details of instruments.

The general impression conveyed to the reviewer by the volume is not so much of striking discoveries as of a steady output of careful work which almost invariably contributed materially to the general advance of spectroscopy. Nevertheless, only a small part of the work can be described as having been of a routine character, and the papers have a special value on account of the great variety of experimental methods devised by the authors with definite objects in view. Thus the student or the beginner in spectroscopic research will find an abundance of useful hints on manipulation which it would be difficult to find in a convenient form elsewhere.

Perhaps the most laborious piece of work undertaken by the authors was that on the ultra-violet spectra of the elements, which involved the taking of some thousands of photographs, and the determination of wave-lengths under conditions much more difficult than would be the case at the present time. The recognition of "harmonic series" of lines, with alternating sharp and diffuse members, was a notable outcome of this work, and although the authors were not completely rewarded by the discovery of the laws of spectral series, their observations greatly facilitated the subsequent investigations of series lines by Rydberg.

Spectroscopy is full of pitfalls, largely on account of the difficulty of preparing perfectly pure substances for experiment, but the authors have had the satisfaction of themselves correcting some of their misinterpretations of observations, as in the case of certain silicon lines at first assigned to carbon, and a triplet of the Swan spectrum attributed, in the first instance, to cyanogen. It might have been expected, however, that they would have taken advantage of the opportunity of indicating, by footnotes or otherwise, further developments in connection with some of the subjects dealt with. It might have been pointed out, for example, that about 50 per cent. of the unidentified lines of atmospheric gases not condensed at the temperature of liquid hydrogen are accounted for by the second spectrum of neon discovered by Merton.

The publication of this volume can scarcely fail to stimulate further research in many directions. One point which has received less attention than it deserves is the observation by the authors that the mixed vapours of magnesium and sodium, in their experiments on reversals, yielded an absorption line about wave-length 5300, which did not appear with either vapour separately, or when sodium was replaced by potassium. Other lines were similarly found to be characteristic of a mixture of magnesium and potassium. Since mixtures of vapours

are involved in the sun and stars, as well as in many of the laboratory applications of spectrum analysis, the possibility of the development of lines characteristic of mixtures would appear to be of fundamental importance. There are probably few observations which favour this supposition, but a more extended investigation is certainly desirable.

The volume concludes with a supplementary memoir, not previously published, on the separation of gases by electric discharges with various electrodes. It fully maintains the high standard of the earlier investigations, and will be appreciated, for example, by anyone who has attempted to prepare a vacuum tube of oxygen uncontaminated with carbon impurities.

The authors may well take pride in this handsome record of their long-continued labours in the field of spectroscopy, but it may be hoped that the volume is not intended to mark the termination of their contributions to the subject.

YORKSHIRE TROUT FLIES.

Brook and River Trouting: A Manual of Modern North Country Methods, with Coloured Illustrations of Flies and Fly-dressing Materials. By H. H. Edmonds and N. N. Lee. Pp. 106. (Bradford: Published by the Authors.) Price 10s. 6d. net.

THIS is an attractive little book, well produced, admirably illustrated, and written by two anglers who obviously know their subject. As what may be called a "local" manual it is as good as anything that has been produced for a long time. It has special claim to consideration in its handling of the question of flies. The authors select some three dozen patterns, commonly and profitably used on north-country streams, and make it possible for the amateur fly-dresser to be sure of getting them right by giving, besides the verbal instructions, coloured plates which show both the flies and the materials of which they are made. One plate also gives the colour shades by which fly-tying silk may be matched. The result is a really practical text-book on which, so far as it goes, the amateur can safely depend. No doubt it will be apparent to many readers that it might go farther, and that a good many favourite flies are omitted from its list. But it is at any rate arguable that the list is sufficient without them, and that an angler entirely without prejudices would do as well with it as he would with any other list of similar length designed to meet similar conditions.

The authors give brief but sound instructions as to methods of fishing on north-country streams, fly-fishing, both wet and dry, creeper and stone-fly fishing, clear-water worming, and spinning the minnow. In each case they illustrate precept by detailed experience, always a useful and interesting plan. When an angler can say "by doing so-and-so I killed so many on such-and-such occasions," and can describe the events which led up to and characterised the successes, it is more convincing than the use of bare imperatives.